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Factsheet

THE ONTARIO SWINE IMPROVEMENT PROGRAM (OSIP)

Cathy Aker, Swine Specialist, Animal Industry Branch

The Ontario Swine Improvement Program (OSIP) is a joint Federal-Provincial performance testing program designed to identify genetically superior breeding stock. It enables seedstock breeders to evaluate the genetic merit of potential breeding stock for backfat thickness and rate of gain.

The objective of the Ontario Swine Improvement Program is to improve the efficiency of production of lean meat. Economically important traits include feed efficiency, backfat thickness and growth rate. Although feed efficiency is difficult to measure accurately, backfat thickness and growth rate are readily measured and are moderately to highly heritable at 40% and 30% respectively. Considerable improvement in lean meat production can be realized by selecting for growth rate and against backfat thickness. This can be accomplished by selecting stock on the basis of a composite index which appropriately weights each of these traits.

The primary benefit of the Swine Improvement Program lies in the identification of seedstock that can contribute to genetic improvement in the commercial sector, thus it is designed primarily for seedstock producers. However, some commercial producers may choose to utilize the program to select crossbred gilts within their own herd. Although this approach does little to improve the genetic merit of the herd, it does serve as a management tool.

Herds enrolled on the program **must** also be part of the Ontario Swine Herd Health Policy which classifies herds according to their health status. The classification of a herd enrolled under the Ontario Swine Herd Health Policy is based on its' health and management. Herds can be classified as Basic, Good or Excellent based on a minimum of four inspections per year and various laboratory tests such as head and lung inspections. A list of herds classified under the policy is published by the Animal Industry Branch, Ontario Ministry of Agriculture and Food on a monthly basis. Under the policy, live animals may move only from herds of a higher to a lower health status or into herds of similar health status.

The Ontario Swine Improvement Program consists of two parts:

1. a home performance test of young boars and gilts
2. a central station test of young boars.

Home Test

Home testing of boars and gilts is carried out by technicians who visit the farms of enrolled producers on a regular basis. Tested boars and gilts are weighed and ultrasonically backfat probed when they are in the weight range of 75 to 105 kg (165 lbs to 230 lbs). Backfat thickness and age are adjusted to a standard weight of 100



Figure 1: Performance tested gilts and boars are weighed and ultrasonically backfat probed between 75 and 105 kg liveweight.

kg (approximately 220 lbs). Pigs can also be weighed on test between 18 and 36 kg (40 to 80 lbs) to determine their average daily gain to 100 kg.

Performance information for each pig tested is entered into a portable microcomputer which provides Estimated Breeding Values (EBV's). EBV's are determined from the pig's own performance test information as well as the EBV's of its' sire and dam as well as sibs and other related animals. Sire and dam EBV's are published by Agriculture Canada and updated on a quarterly basis as more information becomes available on their progeny. All tested pigs are given an EBV for backfat thickness (adjusted to 100 kg) and days to 100 kg as well as an EBV index. EBV's are not given for average daily gain.

Estimated Breeding Values are an estimate of the animal's genetic merit. EBV's on purebred, registered animals are adjusted for the influence of management on that animals performance through "genetic links" which are created by the use of AI, the central boar test station and the sale of breeding stock. Through these methods, animals of a related genetic background can be raised and tested in different herds (environments) thus "links" are created. Because these EBV's are adjusted for management differences between herds, they are valid for across herd comparisons within a breed and region. EBV's on crossbred and non-registered pureline and straightbred animals are not valid for across-herd comparisons. The average EBV for backfat thickness and days to 100 kg is 0 - pigs with negative (-) EBV's are genetically superior whereas pigs with positive (+) EBV's are genetically inferior. The EBV index takes into account the EBV for backfat thickness and days to 100 kg. Each trait is weighted according to its' importance so that 1 mm of backfat has approximately the same importance as 4 days. The average EBV index is 100 - pigs with EBV indexes greater than 100 are breed improvers, those with EBV indexes less than

100 are not. A breed improver will not necessarily improve all herds however, only those in which the average genetic merit of the herd is less than the genetic merit of the animal in question.

Estimated Breeding Values are provided to the breeder for each boar or gilt tested. In addition, EBV's and EBV indexes on tested boars are published in a monthly report. Each quarter, producers enrolled on the program receive a Sire and Dam Report and a Herd Activity Monitor from Agriculture Canada. The Sire and Dam Report lists updated EBV's on sires and dams with tested progeny. The Herd Activity Monitor is a confidential report that allows the breeder to assess genetic and management progress in their own herd.

Station Test

Producers enrolled on the Program must station test a minimum of 10% of the total number of boars home tested during the previous 12 month period. The boar test station located in New Dundee can accommodate testing of 1536 boars per year. The test station consists of 4 isolated sections and each month one section is filled with littermate pairs of boars.

Boars must weigh at least 20 kg (44 lbs) upon arrival at the test station, however, they are not put on test until they reach 29 kg (64 lbs). Prior to the start of test, all boars receive a standard pretest ration. Once on test, they are fed a standard test ration ad-lib. Boars are weighed off test between 75 and 105 kg (165 to 230 lbs). The amount of feed consumed by each pen of two littermate boars throughout the test period is recorded.

Performance information for each boar tested is entered into a portable microcomputer which provides EBV's for backfat thickness and days to 90 kg as well as an EBV index. In addition, average daily gain and feed conversion during the test period are reported, although EBV's are not calculated for these traits. EBV's and EBV indexes are reported on a within-breed basis with all crossbred boars being considered as one group (breed) for evaluation purposes. EBV's on purebred station tested boars are valid for across-herd comparisons (including home-tested boars and gilts), whereas EBV's on straightbred, pureline or crossbred boars are not.

The test station provides a uniform environment for the testing of littermate boars, but more importantly, it serves as an important source of "genetic links" necessary for the computation of EBV's.

Boars that have an EBV index of 100 or greater are carefully inspected for soundness and general health. Selected boars are offered for sale at the monthly Station Tested Boar Sale.

The National Sow Productivity and Management Program

The Sow Productivity Program is designed to provide producers enrolled in the Ontario Swine Improvement Program with a system for monitoring sow productivity and identifying productive sows. In this program sow productivity is defined as kgs of pigs at 21 days per sow per year and is a function of litters per sow per year, pigs weaned per litter and average pig weight at 21 days.



Figure 2: On-farm portable computers provide accurate estimates of EBV's on performance-tested stock.

Litter information is filled in by the producer at breeding, farrowing and weaning. Once the sow has weaned her litter and the sow card has been completed the producer retains one copy and gives the other to the technician. A sow and boar lifetime productivity – selection worksheet and a herd summary are then provided to the producer. The productivity – selection worksheet summarizes the lifetime performance of each sow and boar in the herd and can be used for selection and culling. The herd summary reports the productivity of the entire herd for the last 12 months as well as the change in productivity that occurred in the last quarter.

Table 1. Selection of Seedstock Based on the Average Genetic Performance of the Herd

<u>Average Genetic Performance</u> (from the Herd Activity Monitor)		<u>Explanation</u>
Fat (mm)	-1.40	the herd is genetically 1.4mm leaner and .93 days faster-growing than the average herd (of the same breed and region)
Age (days)	-0.93	

Assume that 4 young boars were just probed and given the following figures:

	<u>EBV - backfat</u>	<u>EBV - Age</u>
Boar A	-1.0	-0.6
Boar B	-1.6	-4.0
Boar C	-1.2	-1.0
Boar D	-1.3	-0.8

Which of these 4 boars, if selected, would improve the herd genetically?

- Boar B - would improve the herd genetically for backfat thickness and growth rate (EBV's are better than the average genetic performance; -1.6 vs -1.4 and -4.0 vs -0.93)
- Boar C - would improve the herd genetically for growth rate (EBV is better than the average genetic performance; -1.0 vs -0.93)

Using OSIP Test Information for Herd Improvement

Considerable genetic improvement in backfat thickness, growth rate and feed conversion can be made by the proper use of performance test information. Not only are these traits moderately to highly heritable and thus readily improved by the selection and use of genetically superior animals, they also allow identification of genetically superior boars and gilts regardless of their herd of origin. Within a breed and region (i.e. Ontario) comparisons can be made between all pigs in performance tested herds.

In making selection and culling decisions, breeders must consider the average genetic performance of their herd (as indicated by their Herd Activity Monitor). The selection and use of breeding stock with EBV's better than the average genetic performance in the herd will result in genetic improvement; the selection and use of breeding stock with EBV's worse than the herd average will not (Table 1). EBV's can also be used by breeders to predict the outcome of a specific mating. By simply averaging the EBV's of the parents the average genetic merit (EBV's) of the progeny can be determined.

Enrolling in the Ontario Swine Improvement Program

Producers who wish to enrol their herds in the program should contact the Manager, Sheep and Swine Improvement Programs, Red Meat Centre, Guelph. (519) 836-3560 or their local county OMAF office.

The home testing fee for the program is based on the total number of sows in the herd and allows breeders to test an unlimited number of boars and gilts. A station testing fee plus the cost of all feed consumed must be paid for station tested boars. The cost of the Ontario Swine Herd Health Policy is dependent upon the classification of the herd.

